

CLAIMS

1. A method of monitoring the condition of a pump or a component of a system comprising a pump which component is not a component of the pump, the method comprising the steps of generating a predetermined test condition in said pump or system component and obtaining signals indicative of a condition of said pump or system during a period in which said test condition is present.
2. A method as claimed in claim 1, wherein said step of generating a predetermined test condition comprises generating an abnormal load condition whereby said pump or system component is subject to an increased stress as compared with normal operating stresses.
3. A method as claimed in claim 2, wherein said step of generating a predetermined test condition comprises causing a reduction in clearance between parts of the pump and said signals are obtained during a period in which said reduction in clearance is present.
4. A method as claimed in claim 3, wherein said pump has a rotor and a stator and the clearance that is reduced is a clearance between the rotor and the stator.
5. A method as claimed in claim 4, wherein said clearance is reduced at least in part by selective control of rotational speed of said rotor.
6. A method as claimed in claim 5, wherein said reduction in clearance is at least in part caused by the steps of causing a predetermined reduction in rotor rotation speed from a selected speed for a predetermined period of time and then causing a predetermined increase in rotor rotation speed above said selected speed for a predetermined period of time.

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7. A method as claimed in any one of claims 3 to 6, wherein said pump is provided with a cooling system and said reduction in clearance is at least in part caused by controlling a rate of flow of coolant to cause a perturbation of temperature in said pump.
8. A method as claimed in any one of claims 3 to 7, wherein said reduction in clearance is at least in part caused by increasing a gas flow rate through said pump.
9. A method as claimed in any one of the preceding claims, wherein said pump is driven by an electric motor and said signals provide an indication of the current supplied to said motor.
10. A method as claimed in any one of the preceding claims, wherein the system component comprises a conduit connected with the pump, and said system condition is a condition of said conduit.
11. A method as claimed in claim 10, wherein said step of generating a predetermined test condition comprises generating a predetermined test flow rate in said conduit that is greater than a normal operating flow rate through said conduit.
12. A method as claimed in claim 11, comprising obtaining said signals indicative of a condition of the system by means of a pressure sensor arranged to sense pressure in said conduit.
13. A method as claimed in claim 11 or 12, wherein said test flow rate in said conduit is generated by injecting a pressurised flow into said conduit.
14. A method as claimed in claim 11, 12 or 13, wherein said test flow rate is generated by injecting a pressurised gas flow into said pump.

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15. A method as claimed in any one of the preceding claims, wherein the pump or apparatus with which the pump is associated is equipped to store said signals
16. A method as claimed in any one of the preceding claims, wherein said signals are transmitted to a storage location via a LAN or the internet.
17. A method as claimed in any one of the preceding claims, wherein said signals are analysed to assess the condition of the pump or system component.
18. A method as claimed in claim 17, wherein said analysing step comprises comparing said signals with signals obtained during at least one previous predetermined test condition of the pump or system component.
19. A method as claimed in claim 17 or 18, wherein said analysing step comprises comparing said signals with pre-programmed data.
20. A method as claimed in claim 17, 18 or 19 wherein said analysing step comprises comparing said signals with signals obtained from at least one other pump or like system component of another system during at least one predetermined test condition of the or each other pump or system component.
21. A method as claimed in claim any one of claims 17 to 20, wherein said analysing step comprises inputting said signals into an algorithm to provide a prediction of pump or system component condition.
22. A method as claimed in any one of claims 17 to 21, wherein said analysing step comprises inputting said signals into an algorithm to provide a prediction of pump or system component life until a predetermined condition of the pump or system component will occur.

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23. A method as claimed in any one of claims 17 to 22, wherein signals indicative of a system component condition are obtained and said analysing step includes using said signals to predict a condition of the pump or system.
24. A method as claimed in any one of claims 17 to 23, further comprising providing an audible indication of the result of said analysing step.
25. A method as claimed in any one of claims 17 to 24, further comprising providing a visual indication of the result of said analysing step.
26. A method as claimed in any one of claims 17 to 25, wherein said pump or system is automatically closed down if said analysing step indicates a predetermined condition of the pump or system component.
27. A method as claimed in any one of the preceding claims, wherein the pump or apparatus with which the pump is associated is able to determine whether the pump or system is in a condition that permits testing of the pump or system component and to cause the implementation of the steps of any one of the preceding claims if said condition permits testing of the pump or system component condition.
28. A method as claimed in claim 27, wherein said determining step is performed at predetermined intervals.
29. A computer program product comprising one or more computer program software portions which, when executed in an execution environment, are operable to implement one or more of the steps of claims 1 to 28.
30. A data storage medium having at least one of said computer program software portions of claim 28 stored thereon.

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31. Apparatus comprising a pump, pump controller and at least one sensing device for sensing a pump operating parameter, said pump controller being able to control said pump so as to selectively generate a predetermined pump test condition and the or each said sensing device providing signals indicating values of said parameter when said test condition is generated.
32. Apparatus as claimed in claim 31, wherein said at least one sensing device comprises a current sensing device for sensing current supplied to a motor that drives said pump.
33. Apparatus as claimed in claim 31 or 32, wherein said at least one sensing device comprises a pressure sensing device for sensing a pressure in said apparatus.
34. Apparatus as claimed in claim 31, 32 or 33, wherein said apparatus comprises a cooling system for said pump, said controller being operable to control said cooling system to generate a said predetermined test condition.
35. Apparatus as claimed in any one of claims 31 to 34, wherein said controller is able to control pump speed to generate a said predetermined test condition.
36. Apparatus as claimed in any one of claims 31 to 35, wherein said apparatus comprises a source of pressurised gas and said controller is able to cause a flow of gas from said source to generate a said predetermined test condition.
37. Apparatus comprising a pump, a controller, an exhaust conduit extending from said pump, at least one sensing device for sensing a condition in said conduit, a connection associated with said pump and or conduit for connecting said pump and or conduit with a source of pressurised gas and valving for controlling flow of said gas into said pump and/or conduit, said controller being able to control said valving to selectively admit said gas into said pump and/or conduit so as to generate a predetermined test condition in

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said conduit and the or each said sensor providing signals indicative of said condition in the conduit when said test condition is generated.

38. Apparatus as claimed in claim 37, wherein said at least one sensing device comprises a pressure sensor for sensing gas pressure in said conduit.
39. Apparatus as claimed in claim 37 or 38, wherein said controller is a controller for said pump.
40. Apparatus as claimed in any one of claims 31 to 36 or claim 39, wherein said controller comprises a computer connectable with said pump.
41. Apparatus as claimed in claim 40, wherein said controller is connectable with the pump via a LAN or the internet.
42. Apparatus as claimed in any one of claims 31 to 41, wherein said controller is arranged to execute one of more of the computer software portions claimed in claim 29 or 30.